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10/523,417

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Rainer Blum

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02/06/2007

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EXAMINER

CORDRAY, DENNIS R

ART UNIT

PAPER NUMBER

1731

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/523,417

Applicant(s)

BLUM ET AL.

Examiner

Dennis Cordray

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-10 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In view of the appeal brief filed on 11/7/2006, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

Response to Arguments

Applicant's arguments, see p 5 and 10-12, filed 11/7/2006, with respect to the rejection of Claims 1-10 over Zhang et al in view of Kuo et al have been fully considered and are persuasive. The rejection has been withdrawn.

The majority of the remaining arguments in the Appeal Brief have been addressed in prior Office Actions, however a few that need further explanation are dealt with below.

With regard to Applicant's footnote on p 3 arguing that, although the Lamar and Small references are relied upon in a minor capacity (support for defining the phrase "close to the headbox"), they should be included in the statement of rejection, the rejection of claims under 35 U.S.C. 102(b) has been withdrawn and a new rejection made under 35 U.S.C. 103(a) as detailed below.

With regard to the *Arkley* test (pp 5-6), using the Lamar and Small references to help define the meaning of a term, and not to provide additional features undisclosed in the primary reference, cannot be reasonably be argued as "picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference." However, the argument is moot in view of the current rejection under 35 U.S.C. 103(a).

As argued on pp 6-7, Applicants admit in the Declaration submitted on 9/29/2006 that the term "close to the headbox" could mean "after the last shearing stage". Applicants further argue, using a simplified flowchart of a papermaking process, the numerous points and order of addition disclosed by Kuo et al in its broadest sense, and state that "for Kuo et al's purposes, no difference in results would be expected, so long as the copolymer and microparticle are added at any of the alternative points shown" in the flowchart. As detailed in previous as well as the current rejection, Kuo et al teaches that, while any reasonable point or order of addition will give beneficial results, the best results (preferred addition point) are obtained with addition of both components close to the headbox (col 10, lines 49-53). Only a few possible locations can be reasonably attributed to being close to the headbox, one of which is after the last point of high

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shear, as taught by Lamar et al, Small et al and admitted by the applicant. Thus, one of ordinary skill in the art would be led to a few preferred addition points, including that which is claimed, and not to dozens of possible alternatives.

Regarding the argument on p 8 that no investigation was made by Kuo et al of any criticality regarding at what specific stage in the papermaking process the retention system is added, the statement of a preferred addition point of "close to the headbox" would appear to indicate that either points of addition were investigated or that it is generally known in the art that best results are achieved at the indicated point "close to the headbox."

Applicant argues on p 8 that Kuo et al does not disclose vinylamine units obtained by hydrolysis of vinylformamide units and that the inventive polymer would appear to contain no vinylamine units. Kuo et al provides several examples wherein the copolymer is a copolymer of N-vinylformamide (NVF), vinylamine VAm) and diallyldimethylammonium chloride (DADMAC) (col 12, lines 1-3, 11-13, 39-41, 48-50; col 13, lines 10-12). Kuo et al discloses that the preferred cationic polymers are formed from N-vinylamide and a diallyldialkylammonium salt (in the above examples, NVF and DADMAC), and then either partly or completely hydrolyzed (up to 100%) to form the VAm units (col 6, lines 13-56; col 8, lines 33-58). In the examples previously cited, the initial NVF units are at least 49% hydrolyzed to VAm.

Applicant argues on p 9 that there is no motivation in Kuo et al to eliminate all polymers with a charge density more than 4 meq/g. Kuo et al broadly discloses a range of usable polymers having charge densities from 1 to 24 meq/g, a preferred

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embodiment of 4 to 22 meq/g and a most preferred embodiment of 10 to 20 meq/g.

Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). Furthermore, "[t]he prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...." *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Applicant argues on p 10 against the Examiner's finding that discovering the optimum or workable ranges by routine experimentation is within the purview of one of ordinary skill in the art by citing *In re Antonie*, 195 USPQ 6, 8-9 (CCPA 1977) (exceptions to rule that optimization of a result-effective variable is obvious, such as where the results of optimizing the variable are unexpectedly good or where the variable was not recognized to be result effective). It is well known in the art that pH, hardness, ionic strength and cationic demand, and other characteristics of the cellulosic furnish affect the performance of a flocculant and that the choice of type of charge, charge density, molecular weight, and type of monomers of the flocculant is dependent upon the water chemistry of the furnish being treated (see Keiser et al, 6361653, col 10, lines 16-22 if evidence is needed). Thus the molecular weight and charge density are recognized in the art to be result effective variables. The point of addition is also recognized as result effective, or Kuo et al could not have stated that best results are obtained with addition close to the headbox. From the above teaching, the charge

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density and molecular weight would necessarily have to be optimized for the particular furnish that is to be treated.

With regard to unexpectedly good results obtained using the claimed polymers, note that no examples are given in the instant Specification that disclose cationic polymers of the claimed charge density, or no examples of polymers comprising vinylamine. The only examples provided to demonstrate the efficacy of the claimed invention use commercial high molecular weight polyacrylamide polymers of undisclosed charge density, and the only experimental tests relate to whether both the polyacrylamide and bentonite are added after the last point of high shear or not. There is thus no evidence of surprising results for the instant invention with regard to the claimed charge density and/or vinylamine containing polymers and no comparison with the polymers of the nearest prior art.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo et al (5529699) in view of Lamar et al (4964955) and Small et al (5690789).

Claim 1: Kuo et al discloses a papermaking process comprising adding to the papermaking stock a retention aid comprising a water soluble cationic polymer and a microparticle (Abstract; col 9, lines 49-58). Kuo et al further discloses that, while the copolymer and microparticles can be added at any point prior to the headbox, the best results (preferred embodiment) are achieved when the copolymer is added to the thin

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stock and the microparticle is added after the copolymer, and that typically, both components are added close to the headbox prior to sheet formation (col 10, lines 43-53). Kuo et al also discloses that, while the dosage amounts can vary widely depending on the nature of the aqueous pulp suspension, those of ordinary skill in the art can readily determine the appropriate dosage amounts by conventional techniques (col 10, lines 54-59), thus the retention aid effective amount would have been obvious to one of ordinary skill in the art.

Kuo et al teaches that forming the aqueous pulp suspension into a sheet requires a rapid reduction of water content, or draining (col 1, lines 63-66). Kuo et al does not explicitly teach drying of the paper sheet, but does teach that the finished sheet has a water content of about 6% (col 2, lines 1-2), thus drying is inherently a part of the papermaking process.

The cationic polymer is a copolymer comprising vinyl amine and diallyldialkylammonium salt monomers. The vinylamine is created by modifying polymerized vinylamide by partial or complete hydrolysis (col 6, lines 13-56; col 8, lines 33-58). The vinyl amide can be vinylformamide and the diallyldialkylammonium salt can be diallyldimethylammonium chloride (col 5, lines 45-48). Several examples are provided wherein the copolymer is a copolymer of N-vinylformamide (NVF), vinylamine VAm) and diallyldimethylammonium chloride (DADMAC) (col 12, lines 1-3, 11-13, 39-41, 48-50; col 13, lines 10-12). The molecular weight of the cationic polymer can be from 3,000 to 4,000,000, preferably from 100,000 to 2,000,000 and most preferably from 100,000 to 1,000,000 (col 8, lines 24-32), which significantly overlaps the claimed

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range. The charge density can be from 1 to 24 meq/g, preferably 4-22 meq/g and most preferably from 10 to 20 meq/g (col 11, lines 14-16). While Kuo et al does not specifically disclose that the microparticle system is free of one or more polymers having a charge density of more than 4 meq/g, at no place does Kuo et al disclose that a polymer having a charge density greater than 4 meq/g is required. In addition, embodiments in the generally disclosed range and the preferable range lie within the claimed range. Note that no examples are given in the instant Specification that disclose the claimed charge density of the cationic polymers, or even of polymers comprising vinylamine.

Kuo et al does not disclose that the microparticle retention system is added after the last shearing stage and before a headbox. However, the preferred addition for best results is to add both components to the thin stock close to the headbox prior to sheet formation.

Lamar et al teaches that "close to the headbox" is after the last point of high shear prior to sheet formation (col 13, lines 15-18). Small et al teaches that a point close to the headbox is after the conditions or heavy shear so that agglomerated or comminuted material is not redispersed (col 2, lines 42-46) or, in other words, after the last high shear stage. From the teachings of Lamar et al and Small et al, one of ordinary skill in the art would recognize that "close to the headbox" can be mean after the last point of high shear and before the headbox.

The art of Kuo et al, Lamar et al, Small et al and the instant invention is analogous as pertaining to making papers. While Lamar et al and Small et al do not

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specifically relate to retention and drainage aids, they do provide one definition of what a point close the headbox means to one of ordinary skill in the art. It would have been obvious to one of ordinary skill in the art to add the microparticle retention system after the last point of high shear and before the headbox in the process of Kuo et al in view of Lamar et al and Small et al as a preferred addition point.

Claim 3: Kuo et al discloses that the preferred cationic polymers are formed from N-vinylamide and a diallyldialkylammonium salt, and then either partly or completely hydrolyzed (up to 100%) to form the N-vinylamine units (col 6, lines 13-56; col 8, lines 33-58). In the examples previously cited, the initial N-vinylformamide units are at least 49% hydrolyzed. A preferred molecular weight disclosed by Kuo et al is 100,000 to 2,000,000, which discloses at least one preferred embodiment within the claimed range. Note that no examples are given in the instant Specification of the use of vinylamine containing polymers at all, but only of polyacrylamide polymers. There is thus no evidence of surprising results for the instant invention with regard to the claimed vinylamine containing polymers.

Claims 4-5 and 7-8: Kuo et al discloses that the cationic polymer is added in an amount from 0.005% to 0.5% by weight based on the dry pulp, with a preferred range of 0.01% to 0.3%. The microparticles can be added in an amount from 0.05% to 3% and preferably from 0.1% to 1.5% by weight based on the dry pulp (col 10, line 62 to col 11, line 2).

Claim 6: Kuo et al discloses that the microparticles can be colloidal silica, bentonite or siliceous materials (col 9, line 62-col 10, line 3).

Claim 9: Kuo et al discloses that the microparticle is preferably added after the copolymer (col 10, lines 49-53).

Kuo et al does not disclose that the polymer and microparticles are metered into the papermaking stock. However, it would have been obvious to one of ordinary skill in the art to meter in the components of the retention system to obtain a dispersed solution.

Claim 10: The microparticle retention system of Kuo et al can provide the claimed reduction in amount of retention aid required because, where the claimed and prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). In other words, when the structure recited in the reference is substantially identical to that of the claims, the claimed properties or functions are presumed to be inherent.

As detailed above, preferred embodiments of Kuo et al overlap the claimed composition, charge density, addition amounts and addition point for the instant invention. Applicant has provided no experimental data demonstrating surprising results over the disclosure of Kuo et al for the inventive microparticle system comprising

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cationic vinyl amine copolymers having particular charge densities (not more than 4 meq/g) and particular molecular weights (greater than 500,000 or 2,000,000) added after the last shearing stage before a headbox. Applicant has only provided data in support of using a high molecular weight commercial cationic polyacrylamide of unknown charge density in combination with bentonite, both added at the claimed addition point. It is thus considered by the Examiner that the embodiments of Kuo et al that overlay the claimed invention would have been obvious to one of ordinary skill in the art.

Allowable Subject Matter

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The nearest prior art, Kuo et al, fails to disclose the use of polyacrylamide in any embodiment. The prior art teaches the use of polyacrylamide alone or in combination with a microparticle and perhaps a second cationic polymer for retention and drainage, but none teaches or suggests all of the particular features of the instant invention. For example, Zhang et al (6379501) teaches use of polyacrylamide or vinyl amine polymers having a charge density in the claimed range, followed by a silicate, with a shear stage between addition of the polymer and the silicate (Abstract; col 13, lines 1-65). Langley et al (EP 235893) teaches use of polyacrylamide having a charge density in the claimed range, with bentonite, but requires a shear stage after addition of the polyacrylamide to break down flocs before the bentonite is added (p 5, line 52 to p 6, line 12). Lorz et al

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(4749444) discloses addition of bentonite, followed by polyacrylamide having a charge density greater than 4 meq/g (Abs). Humphreys et al (6103065) discloses addition after the last point of high shear of a first cationic polymer having a charge density greater than 4 meq/g, followed by a second cationic polyacrylamide having a charge density less than 4 meq/g, then followed by bentonite (col 4, lines 49). While various combinations have been disclosed, there is no motivation in the teachings of the prior art to combine features to provide all of the features the instant invention in Claim 2.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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